The role of green and Sustainability Offices in fostering sustainability efforts at higher education institutions education institutions

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Highlights

- Green Offices may concretely support institutional efforts in pursuing and implementing sustainability
- Some obstacles hinder the realization of sustainability objectives at the institutional level
- Lack of specific funding and lack of support from the administrations are key problems
- Greater efforts are needed to institutionalize sustainability infrastructures.

Abstract

Green and Sustainability Offices are special settings which assist efforts within higher education institutions to coordinate their efforts and work in the field of sustainable development. The set-up of such offices is known to be an effective tool in supporting the implementation of sustainability initiatives on campuses, and in fostering awareness among students and staff on matters related to sustainable development. But despite their usefulness and proven effectiveness, the use of Green Offices and Sustainability Offices is not as wide as it could -or should- be. Also, there is a limited amount of empirical international work performed to date, which have investigated the various barriers related to their works. On the basis of the need to address this research gap, this paper presents the results of an international study on green and sustainability offices, performed with a sample of 70 higher education institutions from round the world. The

study consisted of an on-line survey which identified the extent to which Green Offices or similar infrastructures are being deployed, some specific aspects of their operations and the barriers or difficulties related to their activities. The study concludes by suggesting some measures higher education institutions may deploy, in order to maximise their potential benefits.

1. Introduction: Sustainability Management at Universities

Many Higher Education Institutions (HEI) have been performing efforts in the implementation of sustainable development as a whole, and in their operations in particular, with the aim of reducing the environmental impacts of their operations. The literature has documented the various ways HEIs have been integrating sustainability in the different dimensions of their activities (e.g. Wals 2014; Tilbury 2012; Disterheft et al. 2013, Leal Filho 2011, Leal Filho 2012). Different approaches of how HEI are pursuing this topic have been identified (Lozano et al. 2013 in Lambrechts et al. 2018). They can be classified in six many categories, as outlined in Table 1.

Table 1- Main categories of sustainability implementation at HEIs

Category	Focus
1. Institutional frameworks	Internal procedures, environmental management systems and their implementation
2. Campus operations	Use of resources (e.g. energy, water) and their disposal (e.g. waste) and infra-structure (e.g. transport)
3. Teaching	Implementation of sustainability in the curriculum
4. Research	Implementation of sustainability components in research programmes, as well as research on, for and about sustainable development
5. Outreach/Collaboration	Interaction with internal and external actors and stakeholders
6. Assessment and Reporting	Documentation and dissemination of the work performed and results achieved

Source: authors

Despite the broad focus of sustainability at HEIs, two approaches seem to be more predominant in the recent literature, namely campus operations and institutional initiatives (Vaughter et al. 2013, Wals 2014, Wals and Blewitt 2010, Lambrechts et al. 2018). In this context, the term c*ampus greening* often refers to technical issues such as environmental management, sustainable buildings, renewable energies or carbon footprint and reporting.

A “greener campus” or a more sustainable campus estate, characterised by improved energy and resource efficiency, is not only beneficial from an environment point of view, but can also deliver visible cost savings for institutions. In addition, such

activities are important in enhancing student, staff and community experience and motivation (*'walk the talk', 'practice what you preach'*). Universities as public institutions are often considered to be role-models (Verhulst and Lambrechts 2015, Leal Filho et al. 2015), where more sustainable practices of, for instance, operation and procurement, can be tried out. At the same time, universities are privileged places for the transformation of consumption patterns and behavior (Schneidewind 2014, Mulder 2010). However, it seems that sustainable campus management is often narrowed to ecological issues, although this is by far not a trivial matter (Alshuwaikhat et al. 2008, Sonetti et al. 2015). The German university network HochN, for instance, refers among others[1] to the following areas with regard to campus operations:

- *Sustainable Buildings and energy management*[2] essentially involves the establishment and maintenance of infrastructures for carrying out the core tasks of teaching and research. University buildings create living and working spaces, which guarantee the comfort, health, and satisfaction of the users. There are several assessment frameworks and certification schemes, e.g. the German certificates DNGB and BNB (Bewertungssystem Nachhaltiges Bauen), the British BREEAM (Building Research Establishment Environmental Assessment Method), the American LEED (Leadership in Energy and Environmental Design). All certification labels have defined sustainability criteria. The contents and ambitions of these standards vary greatly and are mainly designed for new buildings.

  However, energy and facility management must also ensure energy savings of existing infrastructure. In doing so, consideration of life-cycle costs is obligatory and includes planning, construction, use, and modernization as well as the deconstruction of buildings. More specifically, building and facility management can contribute through several measures, such as state-of-the-art HCAV and on-campus energy generation systems (e.g. with heat recovery, cogeneration, renewable energies as photovoltaics). Building automation improves, among other things, comfort and influences user behavior, etc. Facility management is responsible for regular inspection and maintenance of installations. As an overall management approach, energy management e.g. according to ISO 50001, covers energy controlling (i.e. metering, benchmarking with KPI, energy evaluation of buildings), energy procurement, planning and implementing of energy-saving measures as well as the inclusion of users (by trainings, bonus-/malus-systems) as well as energy reporting and communication.

- *Procurement*[3]*:* Universities develop strategies and guidelines to ensure that during the procurement of goods and services, sustainability criteria are routinely considered. Major product categories at universities are, for instance, office equipment and supplies, lighting, information and computer technology (servers,

[1] employment relationships, and controlling, communication, research operation,
[2] Günther et al. (2018)
[3] https://www.admin.ox.ac.uk/finance/ppt/purchasing/sustainable/ , Oxford University 2016 (2019-02-13)

computer, monitors, notebooks) and sanitary infrastructure and equipment (hand drying systems, hygiene and cleaning articles). Accordingly, they should be environmentally and socially sound, low-waste, recycled or recyclable, made from renewable raw materials, energy-efficient, climate-neutral, fair, regionally or biologically produced, and transported and traded over least possible distances. Sustainable procurement involves the purchasing department as well as anyone who is ordering goods. Purchasing departments can carry out sustainability assessments of major suppliers. Agreements and sustainability policies can be arranged with preferred suppliers. Environmentally preferably alternatives can be identified and offered to the purchaser, when appropriate. The individual purchaser is encouraged to review critically if the demanded product is really necessary (i.e. prevention and reduction of consumption). Products containing unsustainable materials, such as timber from protected forests or hazardous chemicals should be avoided. Preference could be given to products with a high recycled content or which less harmful to health and the environment. Deliveries to the university may be consolidated to avoid congestion or transport. Suppliers should be preferred that can demonstrate environmental management, ethical trading practices (i.e. working conditions, living wage compliance). Whenever possible, local suppliers should be selected if they are able to deliver the best value.

- *Waste management*[4] at universities includes avoidance and reduction, collection, segregation, handling and disposal of mainly solid but also liquid waste, and even hazardous waste. Major waste streams are office waste (i.e. paper, folders, laminated papers, stationeries and other writing materials, toner and cartridges, batteries, etc.), waste electrical equipment (IT, cables), furniture (desks, chairs, office cabinets), laboratory or clinical waste (chemicals, equipment, wastewater), construction and demolition waste, food waste from cafeterias and general waste from bins all over the campus which may have the character of municipal waste, but also includes plastic bottles or cans or tetra packs (Espinosa et al. 2008). Waste management practices are not uniform in different countries. In some countries, appropriate legal arrangements for waste disposal are in place so that compliance with legislation and requirements should be ensured by the university. In other countries without an effective legal background, the waste hierarchy (i.e. reduce, reuse, recycle, recover, disposal) may provide a guiding principle for sustainable waste management practices. A number of waste streams from universities may have a market value if collected and segregated properly. Therefore, appropriate waste management can help to reduce disposal cost.

- *Sustainable Mobility*[5] at universities comprehends at least three aspects: internal transports and own vehicle fleet, business travel and commuting of staff and students. By far, business travel especially overseas or to remote destinations

[4] https://www.ed.ac.uk/estates/waste-recycling (2019-02-13), Günther et al. (2018)
[5] Günther et al. (2018)

dominates GHG emissions from mobility (for instance 44% of all mobility GHG emissions at the TU Dresden, 37% account for air travel, Günther et al. 2018). Business travel is a good example of a dilemma situation because international cooperation and mutual exchange at academic conferences are essential for HEI. Research projects are a substantial part of the activities and a high level of employee mobility is precisely a quality feature of well-connected universities (Günther et al. 2018). As an alternative possibility, modern communication technologies for web conferences or virtual meetings will be used to a greater extent in the future also due to cost restrictions. Virtual meetings make project cooperation between universities far away from each other possible. The complete processing of projects without the need for personal meetings at the beginning and end of the project is rather rare. In case that air travel cannot be avoided, offsetting of GHG may be considered. For guests at conferences and workshops, environmentally friendly options for arrival and departure could be suggested.

Internal transportation with the universities vehicle fulfills general requirements, such as delivery of consumables (e.g. gas cylinders), removal of residual materials (e.g. scrap metal), postal delivery, passenger transport and pick up of guest, official trips of the administration and other transport tasks. In this area, the university administration has direct access to fleet investments and hence the most direct influence on the environmental effects of mobility. Concrete measures could be planning for the purchasing of fuel-efficient vehicles, substitution by service bicycles, awareness raising and training for fuel-saving driving.

Commuting of staff and students is difficult to influence, as the choice of transport modes is their private affair and not directly in the responsibility of the university. However, universities may be able to adjust in terms of incentives, e.g. discount semester tickets in cooperation with public transport providers and encouragement of carpooling or car-sharing.

While campus greening is sometimes considered being a first step towards a sustainable university, it is a complex endeavor that faces many challenges (Leal Filho et al. 2017). In order to be effective, it is necessary to embed all activities in an institutionalized framework, be it sustainability management system or a task force or other suitable strategies (Ferrer-Balas et al. 2009, Spira et al. 2013, Baker-Shalley et al. 2017, Leal Filho et al. 2018)

Although a transformation to a more sustainable university cannot be forced, among other issues also due to the premise of academic freedom, it is argued, that a whole-institution approach is essential (Moore 2005, Mader et al 2013, Lozano et al. 2013, Lozano et al. 2015, Lozano 2006, Littledyke et al. 2013, Hoover and Harder 2015). The whole institution approach and the attempt to make SD an integral part of research, teaching, and operation needs to be accompanied by transformative environments, organizational learning practices and effective leadership for sustainability (Mader et al. 2013). The participation and inclusion of staff and students are considered as crucial and the “Green Office Model” represent an auspicious approach.

2. The Green Office Model ~~and~~ the Sustainability Office Model

Across universities, the two modalities of offices are predominant and are therefore explored on this paper. A Sustainability Office acts as a node, from where all sustainability related activities are coordinated. They not only involve campus operations, but also research and teaching on matters related to sustainable development.

A Green Office on the other hand, can be defined as a university sustainability platform, usually led by students, that empowers them –and to a lesser extent research staff– to embed sustainability in the curriculum, operations, community and governance. The contrasts among them are also clear: student-led sustainability initiatives are often limited, as they lack funding and institutional access. Staff-led initiatives often struggle to engage students and mobilise teaching staff and researchers to act on sustainability. Unlike traditional sustainability initiatives which tends to focus on academic staff, a formally set Green Office empowers students to lead on sustainability and usually receives funding, mandate and office space from university management (rootAbility and Leuphana University, 2019).

For the purposes of clarity and consistency, this paper will from now on refer to “Green Offices” or “Green Offices and similar settings” meaning that both categories are covered.

Building on previous work in Adomßent et al. (2019), Figure 1 positions the Green Office Model in comparison to established sustainability initiatives by the student community and the university. One distinction is made between policy making, determining the strategic direction of sustainability efforts and project execution, implementing the policy decisions. Another distinction is made between the *student community* as the community of students attending the university and *the university* , including its staff, teaching, research and operations.

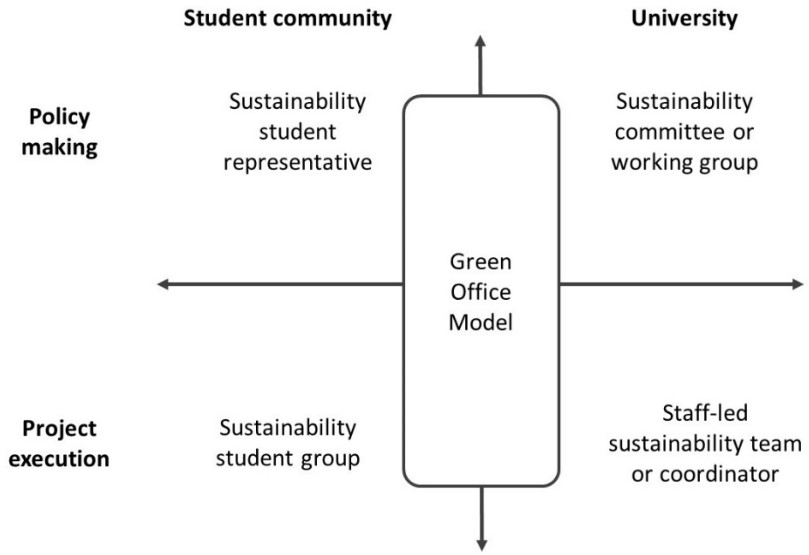

Figure 1 –The Green Office Model in comparison to established sustainability initiatives
Source: Authors

A *sustainability student group* takes the role of executing projects within the student community. Its purpose is for students to increase awareness around sustainability issues among other students. In some cases, a sustainability student group will also lobby towards changes being made by the university. The team consists of only students. As such it provides strong student leadership, but virtually no staff involvement. It operates largely without funding and has to rely on students volunteering their time. In some instances, it may receive minor project funding, if there is strong student-staff collaboration (Spira, 2012).

By contrast, a *sustainability minded-student representative* co-creates policy within the realm of the student community (Wals and Jickling, 2009). In some countries, such as Germany, there is a system of the student community self-governing, with an elected government ("AStA"), which has the right to tax students and freely use those funds. In England, the National Students´ Union plays a similar role and has over the years engaged on a variety of sustainability-related initiatives.

In other cases, student self-governance may be less developed, but student bodies and unions are generally able to allocate and deploy funds and launch projects within the students' community (Bergan, 2004; Chamlee-Wright, 2015; Klemenčič, 2012). Beyond this primary task of self-governance, the student representation may lobby for other changes to be made by the university. Among the student representatives, there may be sustainability committees or representatives personally advocating for sustainability. The representatives volunteer their time or receive a small compensation for their work. They may have funds from the general student government or union budget available for sustainability projects. Such student representatives may also be invited into official university committees as advisors or voting members.

A *staff-led sustainability team or coordinator* –typical of a Sustainability Office– may exist to advance sustainability within the university as a whole. Their primary task is to

perform planning and execute projects, but they may also support sustainability committees and working groups in policy making or take this role if there is no policy forum for sustainability. The teams at Sustainability Office provide for strong staff leadership, but not always count on a strong student involvement. Universities with Sustainability Offices usually allocate them, a working budget, office space and a clear mandate (Appleton, 2017).

A *sustainability committee* establishes the strategic and policy framework for sustainability efforts of a university. Its role is to recommend policies and projects, which are then implemented by other bodies. It will also coordinate actions between actors and monitor and report on progress. The membership of such committees may be diverse. It will generally include university staff and management, as well as students. The committee will either possess a formal mandate from the university or will be recognized tacitly as a legitimate actor through practice (Appleton, 2017).

The *Green Office Model* cuts across these divisions of student community and the university, and of policy and execution, to create a sustainability platform that empowers students and staff to embed sustainability in the curriculum, research, operations, community and governance. It creates a bridge between the student community and the university in policy execution, through its team of students and staff jointly implementing projects (Spira and Baker-Shelley, 2015). It may also be active in policy-making by writing policies or reports itself or in collaboration with a sustainability committee. The set-up of the teams allows for strong student and strong staff leadership and a good integration within the university. Green Offices are also given a working budget, staff, office space and a mandate (rootAbility and Leuphana University, 2019).

The Green Office or similar models are the most popular means of collaboration but there are other forms of cooperation between the student community and universities (Drupp et al., 2012; Kerr and Hart-Steffes, 2012; Winston, 2013), which may be theme based or timely restricted.

Operationally, collaborations in the realm of policy may take the form of open meetings or assemblies that allow students and staff equally to give input into a university's sustainability efforts (Netzwerk n, 2018). Depending on the country and university, students may also be represented in formal governing bodies such as the university or faculty councils, programme committees or faculty boards. These may then also have a role in co-shaping sustainability policies. Alternatively, students can be formal members of sustainability committees or working groups. If students are given sufficient influence in such a committee and the committee has sufficient influence within the university, this may provide a similar level of student leadership in policy matters.

3. Methodology

An international survey was used in order to collect responses from a wide audience of universities. The main idea of this survey was to discuss main aspects of green or sustainability offices at universities as well as challenges and advantages of

their establishment. An interesting approach of this survey is that it was not solely dedicated to universities which already have green or sustainability offices – but also to those who do not have one, but can benefit from the results presented here.

The questionnaire was designed and shared through the online application Google Forms. It contained a set of questions to identify the extent to which Green Offices or similar infrastructures are being deployed round the world, some specific aspects of their operations and the barriers related to their activities. Table 1 summarizes the topics/questions presented in the survey.

Table 1. Topics/questions from the online survey

	Basic information	
	Country	
	Nature	Private, Public
	Focus	Universal (i.e. it covers all subjects including engineering and medicine) General (i.e. it covers most subjects but not all of them) Specific (i.e. technical university, university of applied sciences, liberal arts college, etc)
	Year of foundation	Before 1850, Between 1850-1950, After 1950
	Total number of enrolled students	Up to 5,000 students Between 5,000 and 10,000 students Between 10,000 and 20,000 students More than 20,000 students
	Does your university have a Green Office (or similar such as a Sustainability Office, Sustainable Development Office, Office of Sustainable Development Affairs)?	Yes, No
(A) If YES	For how long has the office been working?	Less than 2 years, Between 2-5 years, More than 5 years
	How many people are employed in the office?	Only 1 person, 2 to 5 persons, More than 5 persons
	Who is employed in the office?	Only staff, Only students, Staff and students
	Do students have the chance to volunteer in your office?	Yes, No
	Which aspects are handled by the office? (multiple answers possible)	Energy Efficiency, Renewable Energy on campus, Waste Management, Water Management, Specific actions to promote the Sustainable Development Goals (SDGs), Extracurricular Sustainable Education, Sustainability Campaigns, Campus community gardens, Sustainability Reporting, Sustainable Procurement, Mobility/Sustainable transportation on campus, Other
	In your opinion, which are the main advantages of having a Green Office (or similar) in your campus?	It increases sustainability awareness, It makes campus efforts more visible, It integrates all aspects of sustainability in only one facility, It promotes curriculum greening, It mobilises students / staff, It promotes sense of sustainable leadership, Other
	Which elements pose a challenge to the work of the Green Office?	Lack of funding, Lack of interest from staff, Lack of interest from student, Lack of expertise, Lack of materials/resources, Lack of support from administration, Other
(B) If NO	To what extent do you think your university should establish a Green Office (or similar)?	To a great extent, To a moderate extent, To a small extent, Not at all
	Which elements would pose a challenge to the office implementation?	Lack of funding, Lack of interest from staff, Lack of interest from student, Lack of expertise, Lack of materials/resources, Lack of support from administration, Other
	In your opinion, which would be the main advantages of having a Green Office (or similar) in your campus?	It would increase sustainability awareness, It would make efforts more visible, It would integrate all aspects of sustainability in only one facility, It would promote curriculum greening, It would integrate staff and

		students, It would promote sense of sustainable leadership, Other
	In your opinion, who should primarily take the initiative to establish a green office (or similar)?	Administration, Staff, Students

The questionnaire was initially pre-tested at the authors' universities in order to check and evaluate survey questions. As a next step, the online survey was sent to the network of universities of the Inter-University Sustainable Development Research Programme (IUSDRP) which groups worldwide academic staff with an interest in sustainable development research and its ramifications[6]. With around 120 member universities distributed in all continents, this network represents a selected group of higher education institutions engaged in sustainability issues. The respondents are members of administration staff in these universities, possessing suitable know-how on campus sustainability and their operational practices. The survey remained open for two months and contained closed-ended questions and one open-ended question where the respondents include additional comments about their experiences.

After data collection, the survey information was analysed by means of simple descriptive statistics, i.e. percentages to describe frequency distributions of answers. Content analysis was used to categorise the qualitative data from the open-ended question.

4. Results and Discussion

In this section the results of the survey will be presented and described in a detailed way. Implications of the research will be discussed. The first set of questions (i.e. questions 1 to 5) aimed at a compilation of general characteristics of the universities from which staff members filled out the questionnaire.

The majority of the respondents (n=70) are from Germany, the Netherlands, Belgium and Brazil (all in all 55%), while other countries are represented with lower shares (n < 4, i.e. Albania, Cameroon, Guatemala, India, Iran, Italy, Lithuania, Malta, Portugal, Serbia, Spain, Switzerland, United Kingdom and the Unites States). Most of the universities are rather large (i.e. 43% with more than 20.000 students, 14% of universities with up to 5.000 students), cover a variety of subjects (72,5%) and are public universities (72,9%). About one third of the universities represented in the sample are private (27,1%), and one third of the universities (27,5%) are specific in the focus, which means that they are technical universities, universities of applied sciences or liberal art colleges. 56% of the universities in the sample have been founded after 1950.

The questionnaire was different for the group of respondents from universities with and without Green Offices or similar structures (i.e, group A: with green

[6] https://www.haw-hamburg.de/en/ftz-nk/programmes/iusdrp.html

offices/sustainability offices, group B: without these offices). Surprisingly, in most of the universities in the sample, a green office or similar[7] are in place (67,1%), mainly over a period of more than 2 years (i.e. 46,8% between 2 – 5 years, and 17% with experience more than 5 years).

Universities with green offices or similar structures have been asked about rather general characteristics (i.e. questions 7-10). In one third of the universities in group A, supposedly the larger ones, more than 5 persons are employed (31,9%), while the majority of offices is equipped with 2 to 5 persons (59,6%) or have one single person responsible (8,5%). In many cases the employees are from staff and students (61,7%). In just under 90% of the surveyed universities, students have the chance to volunteer in the green office (89,4%). Student participation is a major feature of the Green Office Model (rootAbility and Leuphana University 2019, Spira and Baker-Shelley 2015). However, it seems that there is until now no common understanding of the term green office. The term might be used to describe in institutionalization of sustainability management at universities in general and/or to relate to other formal or informal forms of the cooperation with students.

In the next section, the respondents from group A are surveyed about their appraisals and positions towards the characteristics, effectiveness and obstacles.

More than 50% of respondents indicate that the following aspects are considered in the scope of the activities of their office: waste management, sustainability campaigns and specific actions with regard to SDGs, as well as extracurricular education for sustainability and energy efficiency (Figure 3). Well over 40% of the respondents state that their offices deal with sustainability reporting and sustainable mobility/transportation (each 48,9%). Other areas considered in the present offices are: campus and campus community gardens (both with 46,8%), water management (44,7%) and sustainable procurement (42,6%). About one third of the respondents confirmed extracurricular sustainable education as a working field of their green office (31,7%).

Many other examples for activities have been provided by different single respondents (n=1), such as, for example more sustainable catering, protection of green spaces, integration in existing lectures and the responsibility for keeping the campus environmental license (i.e. the certification of the EMS). From the responses it can be seen that the working area of Green Offices or similar structures are rather diverse and not limited to single topics. They include but are not limited to the integration and participation of students within campaigns and other motivational instruments such as campus community gardens. On the other hand, there are aspects that can only be treated in close cooperation with university staff, such as management of waste, water and energy, mobility, and reporting.

[7] such as a Sustainability Office, Sustainable Development Office, Office of Sustainable Development Affairs

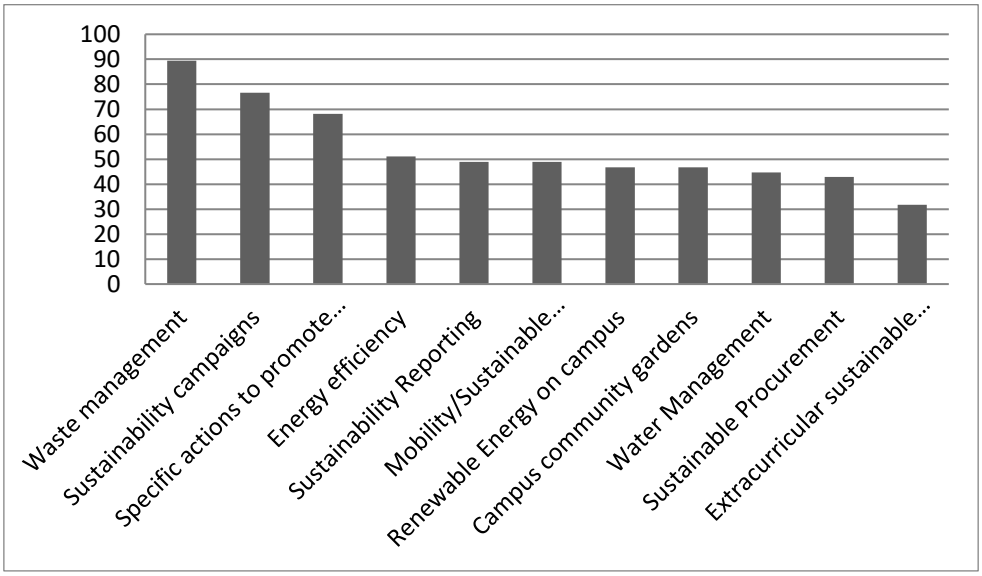

Figure 3. Aspects considered in existing green offices or similar (descending percentages)

The following set of questions also had predefined (default) response categories (i.e. nominal scale) which could be selected by the respondents. Multiple answers were permitted and under the category "other" free answers could be given. In the analysis, the answers have been categorized with regard to the percentages of consents to a default answer (i.e. selecting an answer). When more than 50% of the respondents selected a specific default answer, a high degree of approval is supposed (i.e. the majority of respondents). A frequency distribution between 49% and 20%, is interpreted as a medial approval by the respondents. Lower percentages occurred mainly in the category "others" and related often to meaningful other options, i.e. advantages, barriers and responsibilities of the offices.

The respondents have been split into two groups, i.e. group A (with green office or similar) and group B (without these offices). The questions for the groups were slightly different (i.e. "which *are* advantages" and "which *would be* advantages") and surveyed attitudes, positions and expectations towards the (a) perceived and selected advantages of the offices work and (b) the perceived and selected barriers towards their implementation.

a) Advantages of having a green office or similar structure (see Figure 4)
The majority on both groups (i.e. with or without an office), felt or expect that the main advantage of having a structure like that lies in awareness raising by making the efforts with regard to campus sustainability more visible. By doing so, participants have stated that the offices can promote a sense of sustainable leadership, mobilize and integrate students and staff. More than 40% of the respondents indicated that green offices or similar bring together different aspects of sustainability into one (central administrative)

facility. The offices are also considered to promote curriculum greening. Significant differences (about 10%) between the two groups occur with regard to the expectations related to leadership and the integration of activities to one responsible administrative unit. Respondents from universities with green or sustainability offices state the leadership effect as being more important (in terms of percentages). The share of respondents seeing an advantage in the clustering of actions into one facility is lower in this group. This might be an indication that the expectation is not fully met in universities with such offices.

In the category "other", single respondents (group A) stated that their university offices helped promote sustainability issues in operations, created sustainable start-up initiatives and contributed to holding the administration accountable. Also it was indicated, that a bridge between students and staff was built and, presumably in terms of outreach, sustainable communities have been formed. Expectations in group B are rather high: the offices are expected to transform universities, promote sustainability across curricula and allow for associations with external partners. An important finding of the survey is that universities might generally benefit from the implementation of green offices or similar structures mainly in the field of leadership, promotion and mobilization of students. Other works have suggested instruments for enhanced student participation (Disterheft et al. 2015, Disterheft et al. 2016).

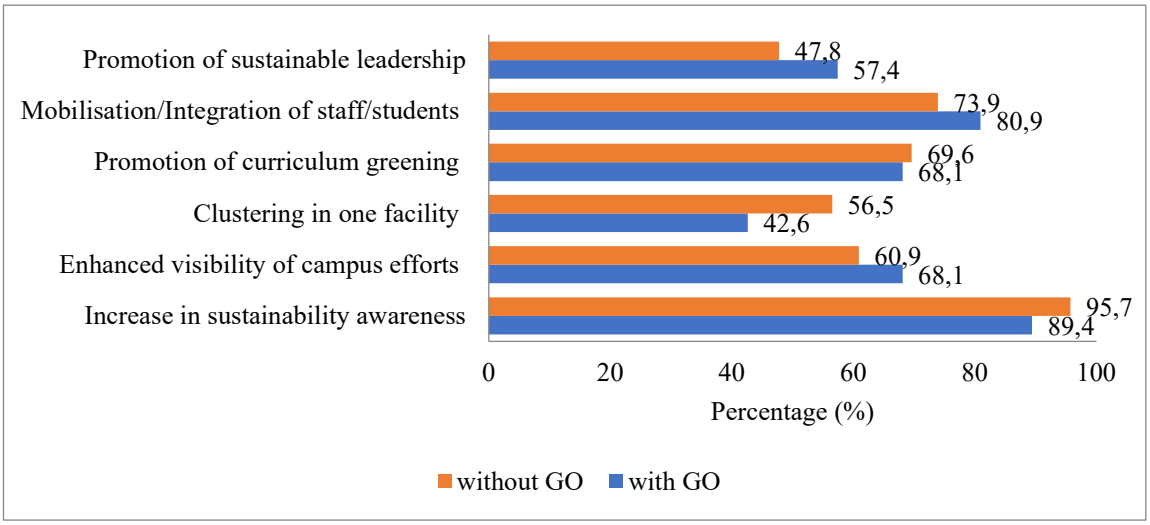

Figure 4: Answers referring to advantages of having a green office or similar (group A with green office n=47, group B with green office n=23)

b) Challenges against implementation of a green office or similar structure (see Figure 5)

When asked about the main barriers for the implementation of green offices or similar, the lack of funding and lack of support from administrations were frequently selected by the respondents in both groups (more than 49%). Lack of interest from staff as well as lacking materials/resources and expertise are evaluated the same range in percentage in both groups (between 30-48%). The groups differ in the perception of the aspect of interest from students, where in the group with established offices, this is considered as challenge by 36,2% and only by 13% in the other group. With regard to the support by administration, the situation is different. Here, the respondents in group B consider lacking support as more relevant (60,9%) than the respondents from universities with existing offices (48,9%). Single respondents from group A suggested further challenges with regard, for example, to difficulties to reach and engage students and to the problem that offices may create a parallel structure which is not connected to "real" operational procedures. It was also stated that institutional bureaucracy is seen as challenge. No significantly different challenges have been stated by respondents from group B. The major obstacles for green offices or similar structures is lack of funding and lack of support by the university administration, which is in line with previous studies. It has been stated that, for example, administrative and systemic sluggishness and hence time lacks in terms of decision making are important obstacles (Velazquez et al. 2005). It has been stated in other studies, that administration and management were under the greatest obstacles (Leal Filho et al. 2017). It was not surprising and known from other studies that lack of financial resources and budget restrictions led to significant barriers for the implementation of sustainability management in general (Brandli et al. 2015, Dahle and Neumayer 2015, Lozano 2006).

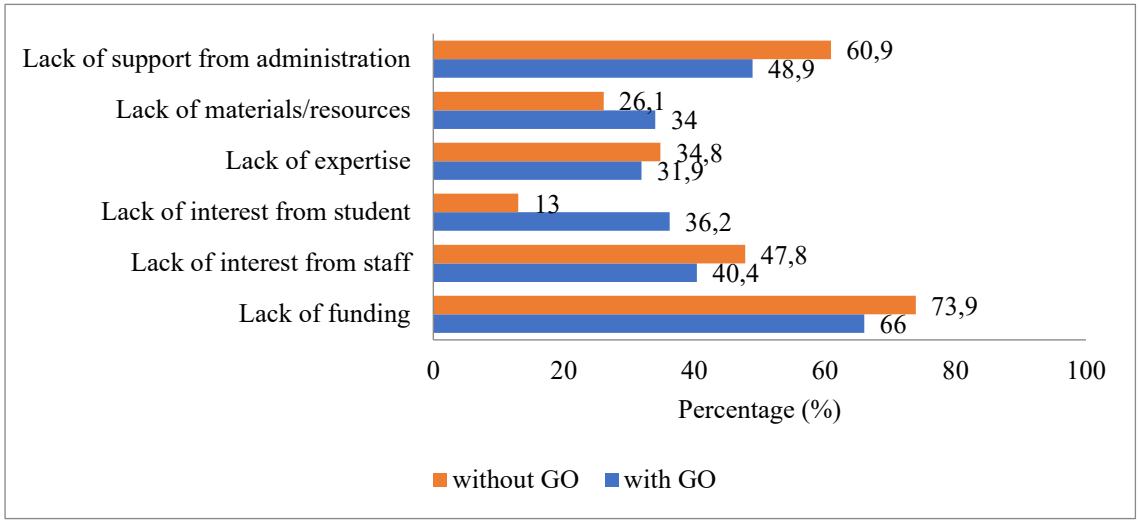

Figure 5: Answers referring to challenges against implementation of a green office or similar

Finally, two questions were offered for group B (without green offices or similar) and asked for personal opinions (attitudes) towards the implementation of such offices and the main actors in the establishment. It turned out from the answers, that a majority

(59,1%) of the respondents consider it important to establish a sustainability office (to a great or moderate extent, i.e 59,1% and 22,7%), while only a minority sees these aspects only to a small extent (18,2%). No respondent selected the 'not at all' option.

The space for additional comments resulted in important discussion topics. According to the content analysis of the provided answers, five main topics were collected and could be related to the literature, as presented in Table 2.

Table 2. Main topics

Main topic	Some issues raised	Relation with the literature
Endorsement	- Importance of having green activities endorsed in a bottom-up approach – although a good consensus with top-down approaches eventually facilitates these activities; - Green Offices or similar should be considered specific organisational units within universities and therefore have their legal regulation; - As a complement of the last topic, these units should also have their own budget in order to help developing plan of actions.	Spira (2012) Appleton (2017)
Real commitment	- Universities need to be really committed to the creation of sustainable change and it therefore needs to be a strategic aim; - Universities need to see themselves more as part of the society and engage in their role to sustainability; - Just having a "Green Office" might not be enough – special caution needs to be taken into consideration in order to avoid greenwashing.	Spira and Baker-Shelley (2015)
Teaching	- Universities should teach more about achieving sustained and holistic progress towards a more sustainable university (from energy consumption and waste reduction to more crucial topics such as teaching students to successfully challenge existing market-focused paradigms and policies and create sustainable practices in their future careers).	Netzwerk n (2018) Green Office Wageningen (2018)
Staff	- Staff is fundamental to create continuity; it helps guarantee more innovation and more yearly projects; - Student involvement seems to be partial in some offices but others have plans to include them in the office committee in the future.	rootAbility and Leuphana University (2019)
Activities	- It may be a challenge to find a balance between running yearly projects and initiating new innovative ones; - Recently established offices might have many plans and slightly struggle in building up structures, developing concrete actions and choosing their main focus.	Otto von Guericke Universität Magdeburg (2019)

These issues, along with the descriptive data gathered from closed-ended questions, represent good additions to the literature by sharing operational aspects and the main barriers that should be overcome. This information is useful for both universities which already have green or sustainability offices and those which are considering to engage on that topic, since important advantages and aspects that should be taken into consideration were discussed in order to maximise to potential benefits of these workplaces.

5. Conclusions

This paper has shown that Green Offices and similar infrastructures may assist efforts within higher education institutions to coordinate their efforts and work in the field of sustainable development. It has outlined the fact that the set-up of such offices can be an effective tool in supporting the implementation of sustainability initiatives on campuses,

and in fostering awareness among students and staff on matters related to sustainable development. However, despite their usefulness, their work has a variety of constraints, which can be political (e.g. lack of support), financial (e.g. lack of resources) or in respect of lack of materials and limitations of expertise. Lack of interest plays, albeit to a lesser extent, a role among the barriers.

There are differences between the modus operandi of Green Offices, Sustainability Offices and other infra-structures. These will be examined in a different paper, which will explore the specific features of Green Offices only, and assess the extent to which they contribute to institutional efforts to promote sustainability.

This paper has some limitations. One of the them is the fact that there were no interviews to complement the on-line data collection. This would prove challenging, bearing in mind the size and the wide geographical distribution of the sample. Also, a limitation was found in respect of the possible bias based on who the respondents were. The IUSDRP database contains researchers, but not support or technical staff, so the details obtained are related to the actual level of knowledge of these respondents. But since they are all sustainability researchers, it is fair to assume they are informed on what is happening at their institutions.

The implications of the paper are two-fold. Firstly, it outlines the usefulness of Green Offices and similar infra-structures as elements which may concretely support the institutional efforts of HEIs in pursuing and implementing sustainability goals. Secondly, the paper has identified some of the key obstacles for the realization of sustainability objectives at the institutional level, among others the lack of specific funding and lack of support from the administrations. This suggests that greater efforts are needed to persuade management to allocate more resources to Green Offices and other similar sustainability infra-structures.

References

Adomßent, M.; Grahl, A. and Spira, F. (2019): Putting sustainable campuses into force: Empowering students, staff and academics by the self-efficacy Green Office Model. International Journal of Sustainability in Higher Education, 20

Alshuwaikhat, H.M.; Abubakar, I. (2008) An integrated approach to achieving campus sustainability: Assessment of the current campus environmental management practices. J. Clean. Prod., 16, 1777–1785

Appleton, E. (2017). *Next Generation Sustainability Strategy and Structure*. Gloucestershire: Environmental Association of Universities and Colleges. available at: www.eauc.org.uk/next_generation_sustainability_strategy_and_str [Accessed 25 Feb. 2019].

Baker-Shelley, A., van Zeijl-Rozema, A. and Martens, P. (2017) 'A Conceptual Synthesis of Organisational Transformation. How to Diagnose, and Navigate, Pathways for Sustainability at Universities?', Journal of Cleaner Production 145: 262-276.

Bauer, M. / Bormann, I. / Kummer, B. / Niedlich, S. / Rieckmann, M. (2018): Sustainability Governance at Universities: Using a Governance Equalizer as a Research Heuristic. In:Higher Education Policy 31 (4), 491-511. DOI: 10.1057/s41307-018-0104-x.

Bergan S. (2004). *Student Participation in Higher Education Governance.* Available at: https://www.semanticscholar.org/paper/STUDENT-PARTICIPATION-IN-HIGHER-EDUCATION-Bergan/845aba2e03d09a9857682335d068d90cdda5dc06 [Accessed 25 Feb. 2019).

Brandli LL, Leal Filho W, Frandoloso ML, Korf EP, Daris D. 2015. The environmental sustainability of brazilian universities: barriers and pre-conditions. In: Leal Filho W, Azeiteiro UM, Caeiro S, Alves F, editors. Integrating sustainability thinking in science and engineering curricula: Innovative approaches, methods and tools. Springer International Publishing; p. 63–74.

Chamlee-Wright, E. (Ed., 2015). *Liberal Learning and the Art of Self-Governance.* Milton Park: Routledge.

Dahle M, Neumayer E. 2001. Overcoming barriers to campus greening: a survey among higher educational institutions in London, UK. Int J Sustainability Higher Educ. 2:139–160.

Disterheft A, Caeiro S, Azeiteiro MU, Leal W (2013) Sustainability science and education for sustainable development in universities: a way for transition. In: Caeiro S et al (eds) Sustainability assessment tools in higher education institutions. doi:10.1007/978-3-319-02375-5_1

Disterheft, A., Azeiteiro, U.M., Leal Filho, W., and Caeiro, S. (2015) 'Participatory processes in sustainable universities – what to assess?', International Journal of Sustainability in Higher Education 16(5): 748–771

Drupp, M., Esguerra, A., Keul, L., Löw, D., Meisch, S. and Roosen-Runge, F. (2012). "Change from below – student initiatives for universities in sustainable development", in

Espinosa, R.M., Turpin, S., Polanco, G., De laTorre, A., Delfín, I. and Raygoza, I. (2008), "Integral urban solid waste management program in a Mexican university", Waste Management, Vol. 28 No. S1, pp. S27-S32

Ferrer-Balas, D., Buckland, H., and de Mingo, M. (2009) 'Explorations on the University's role in society for sustainable development through a systems transition approach. Case-study of the Technical University of Catalonia (UPC)', Journal of Cleaner Production 17(12): 1075–1085.

Grahl, A.T. (2016). *Sustainability Progress Report 2015*. Maastricht: Maastricht University Green Office. Available at: https://docs.wixstatic.com/ugd/88f954_ed12e268be2941e6adccb62d03804050.pdf [Accessed 7 Mar. 2019].

Green Office Utrecht (2019). *Living Lab*. Available at: https://www.uu.nl/en/organisation/green-office-utrecht/living-lab [Accessed 25 Feb. 2019].

Green Office Wageningen (2018). *Green Teacher Awards.* Available at: http://www.greenofficewageningen.nl/green-teachers-award/ [Accessed 7 Mar. 2019].

Hoover, E. and Harder, M.K. (2015) 'What lies beneath the surface? The hidden complexities of organizational change for sustainability in higher education', Journal of Cleaner Production, 106: 175-188.

Kerr, K.G. and Hart-Steffes, J.S. (2012). "Sustainability, student affairs, and students", *New Directions for Student Services*, Vol. 137, pp. 7-17.

Klemenčič, M. (2012). "Student Participation in Higher Education Governance in Europe", *International Higher Education,* Vol. 66, pp. 32-33.

Lambrechts W, Liedekerke KV an Van Petegem P (2018): Higher education for sustainable development in Flanders: balancing between normative and transformative approaches, Environmental Education Research, 24:9, 1284-1300, DOI:10.1080/13504622.2017.1378622

Leal Filho W. (ed) (2012) Sustainable development at universities: new horizons. In: Environmental education, communication and sustainability, vol 34. Peter Lang Internationaler Verlag der Wissenschaften, Bern

Leal Filho, W. (Ed.), *Sustainable Development at Universities.* Bern: Peter Lang Scientific Publishing, pp. 733-742.

Leal Filho W, Jim Wu Y-C., Brandli L.L., Avila L V, Azeiteiro U M, Caeiro S., da Rosa Gama Madruga LR (2017) Identifying and overcoming obstacles to the implementation of sustainable development at universities. Journal of Integrative Environmental Sciences Volume 14, 2017 - Issue 1

Leal Filho, W., Pallant, E., Enete, A., Richter, B., and Brandli, L. L. (2018) 'Planning and implementing sustainability in higher education institutions: an overview of the difficulties and potentials', International Journal of Sustainable Development and World Ecology. Published, doi: 10.1080/13504509.2018.1461707.

Leal Filho W (2011). About the role of universities and their contribution to sustainable development. High Educ Policy 24:427–438 (Palgrave)

Leal Filho, W., Shiel C., do Paço (2015): Integrative approaches to environmental sustainability at universities: an overview of challenges and priorities. Journal
Journal of Integrative Environmental Sciences Volume 12, 2015 - Issue 1

Littledyke, M., Manolas, E., and Littledyke, R.A. (2013) 'A systems approach to education for sustainability in higher education', International Journal of Sustainability in Higher Education 14(4): 367–383.

Lozano, R. (2006) 'Incorporation and institutionalization of SD into universities. Breaking through barriers to change', Journal of Cleaner Production 14(9-11)

Lozano, R., Ceulemans, K., Alonso-Almeida, M., Huisingh, D., Lozano, F.J., and Waas, T.(2015) 'A review of commitment and implementation of sustainable development in higher education. Results from a worldwide survey', Journal of Cleaner Production 108: 1–18.

Lozano, R., Lukman, R., Lozano, F.J., Huisingh, D., and Lambrechts, W. (2013) 'Declarations for sustainability in higher education. Becoming better leaders, through addressing the university system', Journal of Cleaner Production 48: 10–19.

Maastricht University Green Office (2014). *Maastricht University Sustainability Roadmap 2030.* Available at: https://docs.wixstatic.com/ugd/88f954_8e9877fbf5374cad84374f5a1c4c18f6.pdf [Accessed 7 Mar. 2019]

Mader, C., Scott G., and Dzulkifli, A.R. (2013) 'Effective change management, governance and policy for sustainability transformation in higher education', Sustainability 4(3): 264–284

Moore, J., Pagani, F., Quayle, M., Robinson, J., Sawada, B., Spiegelman, G., and van Wynsberghe, R. (2005) 'Recreating the university from within', International Journal of Sustainability in Higher Education 18(2): 65–80.

Mulder K (2010) Don't preach. Practice! value laden statements in academic sustainability education. Int J Sustain High Educ 11(1):74–85 (Emerald Group Publishing Limited). doi:10.1108/14676371011010066

Murray, J. (2018). "Student-led action for sustainability in higher education: a literature review". *International Journal of Sustainability in Higher Education.* Vol. 19 Issue: 6, pp. 1095-1110.

netzwerk n (2018). *Zukunftsfähige Hochschulen gestalten – Beispiele des Gelingens aus Lehre, Forschung, Betrieb, Governance und Transfer*. Available at: https://netzwerk-n.org/wp-content/uploads/2018/08/ONLINE_Print_Version_GoodPracticeSammlung2018_netzwerkn_OnlineVersion-1.pdf [Accessed 7 Mar. 2019].

Otto von Guericke Universität Magdeburg (2019). *Informationen zum Nachhaltigkeitsbüro*. Available at: https://www.ovgu.de/nachhaltigkeitsb%C3%BCro-p-68354.html [Accessed 7 Mar. 2019].

rootAbility and Leuphana University (2017). *Case Studies of Green Office*. Available at: www.greenofficemovement.org/cases [Accessed 25 Feb. 2019].

rootAbility and Leuphana University (2019). *Green Office Model Guide.* Available at: www.greenofficemovement.org [Accessed 25 Feb. 2019].

Schneidewind U (2014) Von der nachhaltigen zur transformativen Hochschule. Perspektiven einer "True University Sustainability". UmweltWirtschaftsForum 22:221–225. doi:10.1007/s00550-014-0314-7

Spira, F. (2012). “Sowing sprouts to engender greener universities – a qualitative study to explore the projects, challenges and strategies of sustainability student groups”. *Maastricht Journal of Liberal Arts,* Vol. 4, pp. 41-55.

Spira, F., Tappeser, V., and Meyer, A. (2013) ‘Perspectives on Sustainability Governance from Universities in the USA, UK, and Germany: How do Change Agents Employ Different Tools to Alter Organizational Cultures and Structures?’, in S. Caeiro, W. Leal Filho, C. Jabbour, and U. M. Azeiteiro (eds.) Sustainability Assessment Tools in Higher Education Institutions. Mapping Trends and Good Practices around the World, Cham: Springer,pp. 175–187.

Spira, F. and Baker-Shelley, A. (2015). “Driving the Energy Transition at Maastricht University? Analysing the Transformative Potential of the Student-Driven and Staff-Supported Maastricht University Green Office”, in Filho, W. L. (editor), *Transformative Approaches to Sustainable Development at Universities*. Hamburg: Springer, 207-224.

Sterling, S., Maxey, L. and Luna, H. (2013). *The Sustainable University: Progress and prospects.* Milton Park: Routledge.

Tilbury D (2012) Higher education for sustainability. A global review of commitment and progress. In: GUNI (ed) Higher education in the world 4. Higher education’s commitment to sustainability: from understanding to action. GUNI series on the social commitment of universities 4, vol 1. Palgrave Macmillan, Basingstoke, pp 18–22

Vaughter, P., T. Wright, M. Mckenzie, and L. Lidstone. 2013. “Greening the Ivory Tower: A Review of Educatio Sustainability in Post-Secondary Education.” Sustainability 5 (5): 2252–2271: doi:10.3390/su5052252

Velazquez L, Munguia N, Sanchez M. 2005. Deterring sustainability in higher education institutions: An appraisal of the factors which influence sustainability in higher education institutions. Int J Sustainability Higher Educ. 6:383–391.

Verhulst E, Lambrechts W (2015): Fostering the incorporation of sustainable development in higher education. Lessons learned from a change management perspective. Journal of Cleaner Production 106 (2015) 189-204.

Wals, A. E. J. 2014. “Sustainability in Higher Education in the Context of the un DESD: A Review of Learning and Institutionalization Processes.” Journal of Cleaner Production 62: 8–15. doi:10.1016/j.jclepro.2013.06.007.

Wals, A. E. J., and J. Blewitt. 2010. “Third-wave Sustainability in Higher Education: Some (Inter)National Trends and Developments.” In Sustainability Education: Perspectives and Practice across Higher Education, edited by P. Jones, S. Selby and S. Sterling, 55–74. London: Earthscan

Wals, A. and Jickling, B. (2009). “A framework for young people’s participation in sustainability”, in Blaze Corcoran, P. and Osano, P.M. (eds.), *Young people, education and sustainable development: Exploring principles, perspectives, and praxis*. Wageningen: Wageningen Academic Publishers, pp. 77-84.

Winston, F. (2013). “Decisions to make a difference: The role of efficacy in moderate student activism”, *Social Movement Studies.* Vol. 12 No. 4, pp. 414-428.